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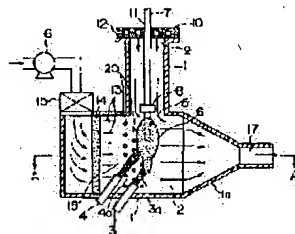
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(54) APPARATUS FOR PRODUCING POROUS OPTICAL FIBER PREFORM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an apparatus for producing a porous optical fiber preform capable of preventing the adhesion and deposition of glass particulates on the inside wall side of a reaction vessel even if the volume of this reaction vessel is small.

SOLUTION: The porous optical fiber preform 6 is produced by depositing the glass particulates synthesized in flames 3a, 4a of burners 3, 4 on a starting rod 5 within the reaction chamber 2 of the reaction vessel 1. The reaction vessel 1 is provided with a discharge port 17 on the side opposite to the installation side of the burners 3, 4 across the porous optical fiber preform 6 to discharge the waste gases in the reaction chamber 2. The reaction chamber 2 is internally provided with flow guide walls 18 respectively on both sides across the burners 3, 4. These flow guide walls 18 are provided with many gas blow-off ports 20 for blowing off a gas for preventing glass particulate adhesion into the reaction chamber 2.



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CLAIMS

[Claim(s)]

[Claim 1] In a reaction chamber of a reaction container, make a start rod deposit glass particles compounded in a flame of a burner, and a porosity optical fiber preform is manufactured. In a porosity optical fiber preform manufacturing installation which establishes an exhaust port in the opposite side on both sides of said porosity optical fiber preform at said reaction container with a said burner installation-side, and discharges exhaust gas in a reaction chamber A porosity optical fiber preform manufacturing installation characterized by preparing a flow guide wall in both sides said whose burners were pinched within said reaction container, respectively, and preparing a gas exit cone of a large number which make gas for glass-particles antisticking blow off in said reaction chamber in these flow guide wall.

[Claim 2] In a reaction chamber of a reaction container, make a start rod deposit glass particles compounded in a flame of a burner, and a porosity optical fiber preform is manufactured. In a porosity optical fiber preform manufacturing installation which establishes an exhaust port in the opposite side on both sides of said porosity optical fiber preform at said reaction container with a said burner installation-side, and discharges exhaust gas in a reaction chamber A flow guide wall is prepared in both sides said whose burners were pinched within said reaction container, respectively. A path of the rectification style is formed between these flow guide walls, and means forming of the rectification style which passes a rectification wind from said burner of this path of the rectification style to the upstream at said porosity optical fiber preform side is established. Into a portion of said flow guide wall which counters each portion into which a gas stream and a flame from said burner flow along with a peripheral wall of said porosity optical fiber preform A porosity optical fiber preform manufacturing installation characterized by preparing a gas exit cone of a large number which make gas for glass-particles antisticking blow off in said reaction chamber.

[Claim 3] A porosity optical fiber preform manufacturing installation according to claim 2 characterized by preparing a gas supply path for glass-particles antisticking which became independent between said each flow guide wall and a wall of said reaction container which counters this, respectively.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the porosity optical fiber preform manufacturing installation which a start rod is made to deposit the glass particles compounded in the flame of a burner, and manufactures a porosity optical fiber preform in the reaction chamber of a reaction container.

[0002]

[Description of the Prior Art] Drawing 4 is the cross-sectional view having shown the outline configuration of the conventional porosity optical fiber preform manufacturing installation.

[0003] In this porosity optical fiber preform manufacturing installation, in the reaction chamber 2 of the reaction container 1, the glass particles compounded in each flame 3a of the core burner 3 and the clad burner 4 and 4a are made to deposit on the lower limit of the start rod 5, and the porosity optical fiber preform 6 is manufactured.

[0004] The means forming 14 of the rectification style which consists of a filter which inhales the open air to horizontal end opening of the reaction container 1, and forms 13 of the rectification style in it by the side in which each burners 3 and 4 exist is established.

[0005] With the installation side of the means forming 14 of the rectification style, on both sides of the porosity optical fiber preform 6, an exhaust port 17 is established in the opposite side, and it is in the reaction container 1. Although not illustrated, the suction means like exhaust air Blois is connected, by attracting the inside of a reaction chamber 2, atmospheric air is inhaled through the means forming 14 of the rectification style by this exhaust port 17, and 13 of the rectification style is formed in it. Taper section 1a is prepared in the reaction container 1 towards the exhaust port 17.

[0006] In such a porosity optical fiber preform manufacturing installation, the glass particles compounded in each flame 3a of each burners 3 and 4 and 4a, passing 13 of the rectification style formed by the means forming 14 of the rectification style to the porosity optical fiber preform 6 side through each burners 3 and 4 are made to deposit on the lower limit of the start rod 5 which goes up rotating, and the porosity optical fiber preform 6 is manufactured. In this case, when a lower part is seen from the upper part of the porosity optical fiber preform 6, the gas stream and Flames 3a and 4a from each burners 3 and 4 will be carried out for about 2 minutes, and will flow along with the peripheral wall of this porosity optical fiber preform 6, and the glass particles compounded in each flame 3a and 4a will accumulate on the tip side of this porosity optical fiber preform 6.

[0007]

[Problem(s) to be Solved by the Invention] However, in such a conventional porosity optical fiber preform manufacturing installation of structure, when capacity of the reaction container 1 was made small, there was a trouble which the adhesion deposition of the glass particles is carried out at the wall of the reaction container 1, and these deposited glass particles exfoliate and carries out the reattachment to the porosity optical fiber preform 6 as a foreign matter in a portion with a narrow distance of the porosity optical fiber preform 6 and the wall of the reaction container 1. the capacity which will be attracted from the suction means side of an exhaust port 17 if it does in this way although it is possible that capacity of the reaction container 1 is enlarged and the distance of the porosity optical fiber preform 6 and the wall of the reaction container 1 enlarges as one means to avoid this -- many -- not carrying out -- it does not obtain but there is a trouble that processing equipment of the exhaust gas discharged from a suction means in connection with this becomes large-scale. Moreover, in order to attract the atmospheric air by which the interior of a room was air-conditioned, air-conditioning costs were also cut in many.

[0008] The purpose of this invention is to offer the porosity optical fiber preform manufacturing installation which can prevent that the adhesion deposition of the glass particles is carried out at the wall side of a reaction container, even if the capacity of a reaction container is small.

[0009]

[Means for Solving the Problem] This invention improves a porosity optical fiber preform manufacturing installation which a start rod is made to deposit glass particles compounded in a flame of a burner, a porosity optical fiber preform is manufactured, and a burner installation-side establishes an exhaust port in the opposite side on both sides of a porosity optical fiber preform at a reaction container, and discharges exhaust gas in a reaction chamber in a reaction chamber of a reaction container.

[0010] a porosity optical fiber preform manufacturing installation concerning this invention -- if it is, a flow guide wall is prepared in both sides whose burners were pinched within a reaction container, respectively. A gas exit cone of a large number which make gas for glass-particles antisticking blow off in a reaction chamber in these flow guide wall is prepared.

[0011] Thus, if a flow guide wall is prepared in both sides whose burners were pinched within a reaction container and a gas exit

cone of a large number which make gas for glass-particles antisticking blow off in a reaction chamber in these flow guide wall is prepared, it can prevent that the adhesion deposition of the glass particles is carried out at a wall side of a reaction container by gas for glass-particles antisticking which blows off from these gas exit cone. For this reason, even if capacity of a reaction container is small, it can prevent that the adhesion deposition of the glass particles is carried out at a wall side of a reaction container. Moreover, if capacity of a reaction container is made small, a miniaturization of offgas treatment equipment which processes exhaust gas discharged from this reaction container can be attained. And according to such structure, gas for glass-particles antisticking can be made to blow off into a reaction chamber again, without hurting feelings of a reaction container.

[0012] moreover, a porosity optical fiber preform manufacturing installation concerning this invention, if it is A flow guide wall is prepared in both sides whose burners were pinched within a reaction container, respectively. A path of the rectification style is formed between these flow guide walls, and means forming of the rectification style which passes a rectification wind from a burner of this path of the rectification style to the upstream at a porosity optical fiber preform side is established. It can also be made structure where a gas exit cone of a large number which make gas for glass-particles antisticking blow off in a reaction chamber into a portion of a flow guide wall which counters each portion into which a gas stream and a flame from a burner flow along with a peripheral wall of a porosity optical fiber preform was prepared.

[0013] Since means forming of the rectification style which passes a rectification wind is prepared in a porosity optical fiber preform side, it can lead to a burner side, guiding a rectification wind effectively with each flow guide wall, and the upstream can be made to deposit especially glass particles compounded in a flame of a burner at a tip of a start rod or a porosity optical fiber preform under uniform environment with this structure from a burner of a path of the rectification style between each flow guide wall.

[0014] In this case, it is desirable to prepare a gas supply path for glass-particles antisticking which became independent between each flow guide wall and a wall of a reaction container which counters this, respectively. If it does in this way, the amount of supply of gas for glass-particles antisticking to many gas exit cones can be adjusted easily.

[0015]

[Embodiment of the Invention] Drawing 1 and drawing 2 are what showed the 1st example of the gestalt of the operation in the porosity optical fiber preform manufacturing installation concerning this invention, drawing 1 is a drawing of longitudinal section, and drawing 2 is the A-A line cross section of drawing 1.

[0016] In this porosity optical fiber preform manufacturing installation, in the reaction chamber 2 of the reaction container 1, the glass particles compounded in each flame 3a of the core burner 3 and the clad burner 4 and 4a are made to deposit at the tip of the start rod 5, and the porosity optical fiber preform 6 is manufactured. In this case, the start rod 5 is grasped with the grasping implement 8 formed in the lower limit of a driving shaft 7. The opening 9 for performing receipts and payments of the start rod 5 or the porosity optical fiber preform 6 is formed in the upper part of the reaction container 1. Opening 9 is closed by the top cover 10. The hole 11 was formed in the top cover 10, and the driving shaft 7 has penetrated free [rise and fall] and free rotation]. Although not illustrated, a rotation drive is carried out around the axial center by the rolling mechanism established up, and a driving shaft 7 goes up and down at elevator guard. In order to prevent that atmospheric air enters from a hole 11, the seal gas blow-off means 12 which blows off seal gas is formed in the top cover 10.

[0017] Moreover, in this porosity optical fiber preform manufacturing installation, the thermal resistance and the corrosion-resistant flow guide wall 18 which consist of the stainless steel which performed corrosion-proof processing to the both sides the core burner 3 and whose clad burners 4 were pinched within the reaction container 1 or a quartz, an alumina, etc. are established, respectively. The path 19 of the rectification style is formed between these flow guide walls 18.

[0018] The means forming 14 of the rectification style which consists of a filter which passes 13 of the rectification style to the porosity optical fiber preform 6 side through each burners 3 and 4 is formed in the upstream of this path 19 of the rectification style.

[0019] Air-supply Blois 16 as an air-supply means to send gas, such as air, into the entrance side of the supply means 14 of the rectification style through a filter 15 is arranged in the upper part of the reaction container 1.

[0020] Moreover, in the reaction container 1, with an each burners 3 and 4 installation-side, on both sides of the porosity optical fiber preform 6, the exhaust port 17 is established in the opposite side, and the exhaust gas in a reaction chamber 2 is discharged. As for the reaction container 1, taper section 1a is prepared towards the exhaust port 17.

[0021] Many gas exit cones 20 which become the portion of the flow guide wall 18 which counters each portion into which the gas stream and Flames 3a and 4a from each burners 3 and 4 are carried out for about 2 minutes, and flow along with the peripheral wall of the porosity optical fiber preform 6 from the hole or slit which makes the gas for glass-particles antisticking blow off in a reaction chamber 2 are formed. Between each flow guide wall 18 and the wall of the reaction container 1 which counters this, the independent gas supply path 21 for glass-particles antisticking is formed, respectively. The damper 22 as an airflow adjustment means for adjusting the airflow of the gas for glass-particles antisticking is formed in the entrance of each gas supply path 21 for glass-particles antisticking. The common gas supply room 23 is established in the entrance side of the means forming 14 of the rectification style, and the entrance side of each gas supply path 21 for glass-particles antisticking. Atmospheric air is similarly sent into this gas supply room 23 through a filter 15 from air-supply Blois 16 as an air-supply means with having been shown in drawing 2.

[0022] Thus, if the flow guide wall 18 is formed in the both sides whose burners 3 and 4 were pinched within the reaction container 1 and the gas exit cone 20 of a large number which make the gas for glass-particles antisticking blow off in a reaction chamber 2 in these flow guide wall 18 is formed, it can prevent that the adhesion deposition of the glass particles is carried out at

the wall side of the reaction container 1 by the gas for glass-particles antisticking which blows off from these gas exit cone 20. For this reason, even if the capacity of the reaction container 1 is small, it can prevent that the adhesion deposition of the glass particles is carried out at the wall side of the reaction container 1. Moreover, if capacity of the reaction container 1 is made small, the miniaturization of the offgas treatment equipment which processes the exhaust gas discharged from this reaction container 1 can be attained. And according to such structure, the gas for glass-particles antisticking can be made to blow off into a reaction chamber 2 again, without hurting feelings of the reaction container 1.

[0023] Especially, with this structure, since the means forming 14 of the rectification style which passes 13 of the rectification style to the porosity optical fiber preform 6 side through burners 3 and 4 at the upstream of the path 19 of the rectification style between each flow guide wall 18 is established It can lead to burner 3 and 4 side, guiding 13 of the rectification style effectively with each flow guide wall 18, and the glass particles compounded in flame 3a of burners 3 and 4 and 4a can be made to deposit at the tip of the start rod 5 or the porosity optical fiber preform 6 under uniform environment. 16

[0024] Moreover, with this structure, since the gas supply path 21 for glass-particles antisticking which became independent between each flow guide wall 18 and the wall of the reaction container 1 which counters this is formed, respectively, the gas for glass-particles antisticking to many gas exit cones 20 can be supplied easily. Furthermore, as shown in drawing 2, even if gas is supplied to each gas supply path 21 for glass-particles antisticking, and the means forming 14 of the rectification style in common from air-supply Blois 16 which is a common air-supply means, the rate of flow of the gas for glass-particles antisticking which blows off from each gas exit cone 20 can be easily adjusted by changing the angle of the damper 22 formed in the entrance side of each gas supply path 21 for glass-particles antisticking, respectively.

[0025] Drawing 3 is the cross section which shows the 2nd example of the gestalt of the operation in the porosity optical fiber preform manufacturing installation concerning this invention. In addition, the same sign is attached and shown in drawing 1 and drawing 2 which were mentioned above, and a corresponding portion. 20

[0026] He is trying not to open the gas supply room 23 and each gas supply path 21 for glass-particles antisticking for free passage in this porosity optical fiber preform manufacturing installation. The gas for glass-particles antisticking of the optimal flow rate is supplied to each gas supply path 21 for glass-particles antisticking from another gas supply opening 24 for glass-particles antisticking prepared in the side wall of the reaction container 1 corresponding to the gas supply path 21 for these glass-particles antisticking.

[0027] Other configurations have the same composition as the 1st example of the gestalt of operation shown in drawing 1 and drawing 2.

[0028] If it is made such a configuration, it will become easy to adjust separately, the airflow of 13 of the rectification style supplied to burners 3 and 4 from the means forming 14 of the rectification style and the airflow of the gas for glass-particles antisticking which blows off from each gas exit cone 20 so that each may become the optimal. 30

[0029] In addition, although a filter 15 is installed in the upper part of the gas supply room 23 and atmospheric air was supplied to the gas supply room 23 from the upper part in drawing 1, a filter 15 can be installed in the left side by drawing 1, and atmospheric air can also be horizontally supplied to the gas supply room 23.

[0030] Moreover, the gas supply room 23 may be wide opened in atmospheric air, instead may connect a suction means to an exhaust port 17, and may form 13 of the rectification style like the example shown in drawing 4.

[0031] [Effect of the Invention] the porosity optical fiber preform manufacturing installation concerning this invention -- if it is, since it prepared the flow guide wall in the both sides whose burners were pinched within the reaction container and the gas exit cone of a large number which make the gas for glass-particles antisticking blow off in a reaction chamber in these flow guide wall is prepared, it can prevent that the adhesion deposition of the glass particles is carried out at the wall side of a reaction container by the gas for glass-particles antisticking which blows off from these gas exit cone. For this reason, even if the capacity of a reaction container is small, it can prevent that the adhesion deposition of the glass particles is carried out at the wall side of a reaction container. Moreover, if capacity of a reaction container is made small, the miniaturization of the offgas treatment equipment which processes the exhaust gas discharged from this reaction container can be attained. Moreover, since the amount of the air-conditioned atmospheric air used can be decreased, an air conditioner can also be miniaturized and air-conditioning cost also becomes cheap. And according to such structure, the gas for glass-particles antisticking can be made to blow off into a reaction chamber again, without hurting feelings of a reaction container.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the drawing of longitudinal section of the 1st example of the gestalt of the operation in the porosity optical fiber preform manufacturing installation concerning this invention.

[Drawing 2] It is the A-A line cross section of drawing 1.

[Drawing 3] It is the cross-sectional view of the 2nd example of the gestalt of the operation in the porosity optical fiber preform manufacturing installation concerning this invention.

[Drawing 4] It is the cross-sectional view having shown the outline configuration of the conventional porosity optical fiber preform manufacturing installation.

[Description of Notations]

- 1 Reaction Container
- 2 Reaction Chamber
- 3 Core Burner
- 3a Flame
- 4 Clad Burner
- 4a Flame
- 5 Start Rod
- 6 Porosity Optical Fiber Preform
- 7 Driving Shaft
- 8 Grasping Implement
- 9 Opening
- 10 Top Cover
- 11 Hole
- 12 Seal Gas Blow-Off Means
- 13 Rectification Wind
- 14 Means Forming of the Rectification Style
- 14a Straightening vane
- 15 Filter
- 16 Air-Supply Blois (Air-Supply Means)
- 17 Exhaust Port
- 18 Flow Guide Wall
- 19 Path of the Rectification Style
- 20 Gas Exit Cone
- 21 Gas Supply Path for Glass-Particles Antisticking
- 22 Damper (Airflow Adjustment Means)
- 23 Gas Supply Room
- 24 Gas Supply Opening for Glass-Particles Antisticking

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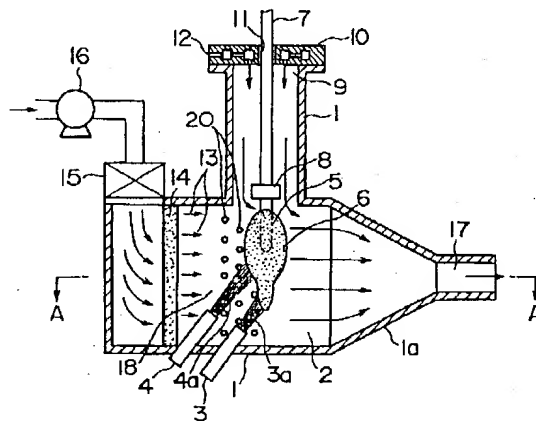
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(54) 【発明の名称】 多孔質光ファイバ母材製造装置

(57) 【要約】

【課題】 反応容器の容積が小さくても反応容器の内壁側にガラス微粒子が付着堆積されるのを防止できる多孔質光ファイバ母材製造装置を得る。

【解決手段】 反応容器1の反応室2内で、バーナ3、4の火炎3a、4a中で合成したガラス微粒子を出発口5に堆積させて多孔質光ファイバ母材6を製造する。反応容器1にはバーナ3、4の設置側とは多孔質光ファイバ母材6を挟んで反対側に排気口17を設けて反応室2内の排ガスを排出する。反応容器2内でバーナ3、4を挟んだ両側に、フローガイド壁18をそれぞれ設ける。これらフローガイド壁18にガラス微粒子付着防止用ガスを反応室2内に吹出させる多数のガス吹出し口20を設ける。



【特許請求の範囲】

【請求項1】 反応容器の反応室内で、バーナの火炎中で合成したガラス微粒子を出発ロッドに堆積させて多孔質光ファイバ母材を製造し、前記反応容器には前記バーナの設置側とは前記多孔質光ファイバ母材を挟んで反対側に排気口を設けて反応室内の排ガスを排出するようになっている多孔質光ファイバ母材製造装置において、前記反応容器内で前記バーナを挟んだ両側にフローガイド壁がそれぞれ設けられ、これらフローガイド壁にガラス微粒子付着防止用ガスを前記反応室内に吹出させる多数のガス吹出し口が設けられていることを特徴とする多孔質光ファイバ母材製造装置。

【請求項2】 反応容器の反応室内で、バーナの火炎中で合成したガラス微粒子を出発ロッドに堆積させて多孔質光ファイバ母材を製造し、前記反応容器には前記バーナの設置側とは前記多孔質光ファイバ母材を挟んで反対側に排気口を設けて反応室内の排ガスを排出するようになっている多孔質光ファイバ母材製造装置において、前記反応容器内で前記バーナを挟んだ両側にフローガイド壁がそれぞれ設けられ、これらフローガイド壁間に整流風通路が形成され、該整流風通路の前記バーナより上流側に前記多孔質光ファイバ母材側に整流風を流す整流風形成手段が設けられ、前記バーナからのガス流及び火炎が前記多孔質光ファイバ母材の周壁に沿って流れる各部分に対向する前記フローガイド壁の部分に、ガラス微粒子付着防止用ガスを前記反応室内に吹出させる多数のガス吹出し口が設けられていることを特徴とする多孔質光ファイバ母材製造装置。

【請求項3】 前記各フローガイド壁とこれに対向する前記反応容器の内壁との間に独立したガラス微粒子付着防止用ガス供給通路がそれぞれ設けられていることを特徴とする請求項2に記載の多孔質光ファイバ母材製造装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、反応容器の反応室内で、バーナの火炎中で合成したガラス微粒子を出発ロッドに堆積させて多孔質光ファイバ母材を製造する多孔質光ファイバ母材製造装置に関するものである。

【0002】

【従来の技術】図4は従来の多孔質光ファイバ母材製造装置の概略構成を示した横断面図である。

【0003】この多孔質光ファイバ母材製造装置では、反応容器1の反応室2内で、コアバーナ3とクラッドバーナ4との各火炎3a、4a中で合成したガラス微粒子を出発ロッド5の下端に堆積させて多孔質光ファイバ母材6を製造するようになっている。

【0004】各バーナ3、4が存在する側で反応容器1の水平方向の一端開口部には、外気を吸い込んで整流風13を形成するフィルタよりなる整流風形成手段14が

設けられている。

【0005】反応容器1には、整流風形成手段14の設置側とは多孔質光ファイバ母材6を挟んで反対側に排気口17が設けられている。この排気口17には、図示しないが排気ブローアの如き吸引手段が接続されていて、反応室2内を吸引することにより整流風形成手段14を経て大気が吸い込まれて整流風13が形成されるようになっている。反応容器1には、排気口17に向けてテーバ部1aが設けられている。

【0006】このような多孔質光ファイバ母材製造装置では、整流風形成手段14で形成した整流風13を各バーナ3、4を経て多孔質光ファイバ母材6側に流しつつ、各バーナ3、4の各火炎3a、4a中で合成したガラス微粒子を、回転しつつ上昇する出発ロッド5の下端に堆積させて多孔質光ファイバ母材6を製造している。この場合、多孔質光ファイバ母材6の上方から下方を見ると、各バーナ3、4からのガス流及び火炎3a、4aがほぼ2分されて該多孔質光ファイバ母材6の周壁に沿って流れ、各火炎3a、4a中で合成したガラス微粒子が該多孔質光ファイバ母材6の先端側に堆積されることになる。

【0007】

【発明が解決しようとする課題】しかしながら、このような構造の従来の多孔質光ファイバ母材製造装置では、反応容器1の容積を小さくした場合、多孔質光ファイバ母材6と反応容器1の内壁との距離が狭い部分で、ガラス微粒子が反応容器1の内壁に付着堆積されて、この堆積したガラス微粒子が剥離して多孔質光ファイバ母材6に異物として再付着する問題点があった。これを回避する1つの手段として、反応容器1の容積を大きくして、多孔質光ファイバ母材6と反応容器1の内壁との距離が大きくなることが考えられるが、このようにすると排気口17の吸引手段側から吸引するガス量を多くせざるを得ず、これに伴い吸引手段から排出される排ガスの処理設備が大掛かりになる問題点がある。また、室内の空調された大気を吸引するため空調費用も多くかかっていた。

【0008】本発明の目的は、反応容器の容積が小さくても反応容器の内壁側にガラス微粒子が付着堆積されるのを防止できる多孔質光ファイバ母材製造装置を提供することにある。

【0009】

【課題を解決するための手段】本発明は、反応容器の反応室内で、バーナの火炎中で合成したガラス微粒子を出発ロッドに堆積させて多孔質光ファイバ母材を製造し、反応容器にはバーナの設置側とは多孔質光ファイバ母材を挟んで反対側に排気口を設けて反応室内の排ガスを排出するようになっている多孔質光ファイバ母材製造装置を改良するものである。

【0010】本発明に係る多孔質光ファイバ母材製造装

置おいては、反応容器内でバーナを挟んだ両側にフローガイド壁がそれぞれ設けられている。これらフローガイド壁に、ガラス微粒子付着防止用ガスを反応室内に吹出させる多数のガス吹出し口が設けられている。

【0011】このように反応容器内でバーナを挟んだ両側にフローガイド壁を設け、これらフローガイド壁に、ガラス微粒子付着防止用ガスを反応室内に吹出させる多数のガス吹出し口を設けると、これらガス吹出し口から吹出すガラス微粒子付着防止用ガスにより、反応容器の内壁側にガラス微粒子が付着堆積されるのを防止できる。このため反応容器の容積が小さくても、反応容器の内壁側にガラス微粒子が付着堆積されるのを防止できる。また、反応容器の容積を小さくすると、該反応容器から排出される排ガスを処理する排ガス処理設備の小形化を図ることができる。かつまた、このような構造によれば、反応容器の気密性を損なわずに、ガラス微粒子付着防止用ガスを反応室内へ吹き出させることができる。

【0012】また、本発明に係る多孔質光ファイバ母材製造装置においては、反応容器内でバーナを挟んだ両側にフローガイド壁がそれぞれ設けられ、これらフローガイド壁間に整流風通路が形成され、該整流風通路のバーナより上流側に多孔質光ファイバ母材側に整流風を流す整流風形成手段が設けられ、バーナからのガス流及び火炎が多孔質光ファイバ母材の周壁に沿って流れる各部分に対向するフローガイド壁の部分に、ガラス微粒子付着防止用ガスを反応室内に吹出させる多数のガス吹出し口が設けられた構造にすることもできる。

【0013】特に、この構造では、各フローガイド壁間の整流風通路のバーナより上流側に、多孔質光ファイバ母材側に整流風を流す整流風形成手段を設けているので、各フローガイド壁で整流風を効果的にガイドしつつバーナ側に導いて、バーナの火炎中で合成されたガラス微粒子を一様な環境下で出発ロッドまたは多孔質光ファイバ母材の先端に堆積させることができる。

【0014】この場合、各フローガイド壁とこれに対向する反応容器の内壁との間に独立したガラス微粒子付着防止用ガス供給通路をそれぞれ設けることが好ましい。このようにすると、多数のガス吹出し口に対するガラス微粒子付着防止用ガスの供給量を容易に調整することができる。

【0015】

【発明の実施の形態】図1及び図2は本発明に係る多孔質光ファイバ母材製造装置における実施の形態の第1例を示したもので、図1は縦断面図、図2は図1のA-A線断面図である。

【0016】この多孔質光ファイバ母材製造装置では、反応容器1の反応室2内で、コアバーナ3とクラッドバーナ4との各火炎3a、4a中で合成したガラス微粒子を出発ロッド5の先端に堆積させて多孔質光ファイバ母材6を製造するようになっている。この場合、出発ロ

ド5は駆動軸7の下端に設けられた把持具8で把持されている。反応容器1の上部には、出発ロッド5や多孔質光ファイバ母材6の出し入れを行うための開口部9が設けられている。開口部9は、上蓋10で塞がれるようになっている。上蓋10には孔11が設けられて、駆動軸7が昇降自在に且つ回転自在に貫通されている。駆動軸7は、図示しないが上方に設けられた回転機構でその軸心の回りに回転駆動され、昇降機構で昇降されるようになっている。上蓋10には、孔11から大気が入るのを防止するためにシールガスを吹出すシールガス吹出し手段12が設けられている。

【0017】また、この多孔質光ファイバ母材製造装置においては、反応容器1内でコアバーナ3とクラッドバーナ4とを挟んだ両側に耐腐蝕処理を施したステンレススチール或いは石英、アルミナ等からなる耐熱性、耐腐蝕性のフローガイド壁18がそれぞれ設けられている。これらフローガイド壁18間には、整流風通路19が形成されている。

【0018】この整流風通路19の上流側には、各バーナ3、4を経て多孔質光ファイバ母材6側に整流風13を流すフィルタよりなる整流風形成手段14が設けられている。

【0019】反応容器1の上部には、整流風供給手段14の入口側にフィルタ15を介して空気等のガスを送り込む給気手段としての給気ブロー16が配置されている。

【0020】また反応容器1には、各バーナ3、4の設置側とは多孔質光ファイバ母材6を挟んで反対側に排気口17が設けられていて、反応室2内の排ガスを排出するようになっている。反応容器1は、排気口17に向けてテーパ部1aが設けられている。

【0021】各バーナ3、4からのガス流及び火炎3a、4aがほぼ2分されて多孔質光ファイバ母材6の周壁に沿って流れる各部分に対向するフローガイド壁18の部分に、ガラス微粒子付着防止用ガスを反応室2内に吹出させる孔又はスリットからなる多数のガス吹出し口20が設けられている。各フローガイド壁18とこれに対向する反応容器1の内壁との間には、独立したガラス微粒子付着防止用ガス供給通路21がそれぞれ設けられている。各ガラス微粒子付着防止用ガス供給通路21の入口には、ガラス微粒子付着防止用ガスの風量を調整するための風量調整手段としてのダンパ22が設けられている。整流風形成手段14の入口側と、各ガラス微粒子付着防止用ガス供給通路21の入口側とは共通のガス供給室23が設けられている。このガス供給室23には、図2に示したと同様に給気手段としての給気ブロー16からフィルタ15を介して大気を送り込まれるようになっている。

【0022】このように反応容器1内でバーナ3、4を挟んだ両側にフローガイド壁18を設け、これらフロー

5

ガイド壁18に、ガラス微粒子付着防止用ガスを反応室2内に吹出させる多数のガス吹出し口20を設けると、これらガス吹出し口20から吹出すガラス微粒子付着防止用ガスにより、反応容器1の内壁側にガラス微粒子が付着堆積されるのを防止することができる。このため反応容器1の容積が小さくても、反応容器1の内壁側にガラス微粒子が付着堆積されるのを防止することができる。また、反応容器1の容積を小さくすると、該反応容器1から排出される排ガスを処理する排ガス処理設備の小形化を図ることができる。かつまた、このような構造によれば、反応容器1の気密性を損なわずに、ガラス微粒子付着防止用ガスを反応室2内へ吹き出させることができる。

【0023】特に、この構造では、各フローガイド壁18間の整流風通路19の上流側に、バーナ3、4を経て多孔質光ファイバ母材6側に整流風13を流す整流風形成手段14を設けているので、各フローガイド壁18で整流風13を効果的にガイドしつつバーナ3、4側に導いて、バーナ3、4の火炎3a、4a中で合成されたガラス微粒子を一樣な環境下で出発ロッド5または多孔質

光ファイバ母材6の先端に堆積させることができる。【0024】また、この構造では、各フローガイド壁18とこれに対向する反応容器1の内壁との間に独立したガラス微粒子付着防止用ガス供給通路21をそれぞれ設けているので、多数のガス吹出し口20に対するガラス微粒子付着防止用ガスの供給を容易に行うことができる。さらに、図2に示すように共通の給気手段である給気ブローア16から、各ガラス微粒子付着防止用ガス供給通路21と整流風形成手段14とにガスが共通に供給されていても、各ガラス微粒子付着防止用ガス供給通路21の入口側にそれぞれ設けたダンパ22の角度を変えることにより、各ガス吹出し口20から吹き出すガラス微粒子付着防止用ガスの流速を容易に調整することができる。

【0025】図3は、本発明に係る多孔質光ファイバ母材製造装置における実施の形態の第2例を示す横断面図である。なお、前述した図1及び図2と対応する部分には、同一符号を付けて示している。

【0026】この多孔質光ファイバ母材製造装置では、ガス供給室23と各ガラス微粒子付着防止用ガス供給通路21とを連通しないようにしている。各ガラス微粒子付着防止用ガス供給通路21には、これらガラス微粒子付着防止用ガス供給通路21に対応して反応容器1の側壁に設けられた別のガラス微粒子付着防止用ガス供給口24から、最適な流量のガラス微粒子付着防止用ガスが供給されるようになっている。

【0027】その他の構成は、図1及び図2に示す実施の形態の第1例と同様な構成になっている。

【0028】このような構成にすると、整流風形成手段14からバーナ3、4に供給される整流風13の風量

6

と、各ガス吹出し口20から吹出すガラス微粒子付着防止用ガスの風量とを別々に、それぞれが最適になるように調整することが容易となる。

【0029】なお、図1ではガス供給室23の上部にフィルタ15を設置して上方から大気をガス供給室23に供給するようにしたが、図1で左側方にフィルタ15を設置して水平方向からガス供給室23に大気を供給することもできる。

【0030】また、ガス供給室23は大気中に開放して、その代わり排気口17に吸引手段を接続して、図4に示す例と同様に整流風13の形成を行ってもよい。

【0031】

【発明の効果】本発明に係る多孔質光ファイバ母材製造装置においては、反応容器内でバーナを挟んだ両側にフローガイド壁を設け、これらフローガイド壁に、ガラス微粒子付着防止用ガスを反応室内に吹出させる多数のガス吹出し口を設けているので、これらガス吹出し口から吹出すガラス微粒子付着防止用ガスにより、反応容器の内壁側にガラス微粒子が付着堆積されるのを防止することができる。このため反応容器の容積が小さくても、反応容器の内壁側にガラス微粒子が付着堆積されるのを防止できる。また、反応容器の容積を小さくすると、該反応容器から排出される排ガスを処理する排ガス処理設備の小形化を図ることができる。また、空調された大気の使用量を減少させることができるので、空調設備も小形化でき、空調代も安くなる。かつまた、このような構造によれば、反応容器の気密性を損なわずに、ガラス微粒子付着防止用ガスを反応室内へ吹き出させることができる。

【図面の簡単な説明】

【図1】本発明に係る多孔質光ファイバ母材製造装置における実施の形態の第1例の縦断面図である。

【図2】図1のA-A線断面図である。

【図3】本発明に係る多孔質光ファイバ母材製造装置における実施の形態の第2例の横断面図である。

【図4】従来の多孔質光ファイバ母材製造装置の概略構成を示した横断面図である。

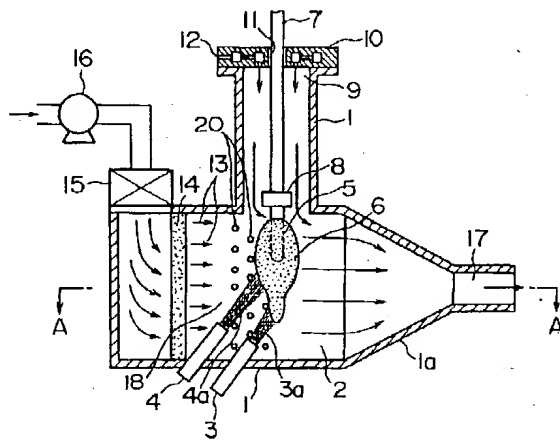
【符号の説明】

- 1 反応容器
- 2 反応室
- 3 コアバーナ
- 3a 火炎
- 4 クラッドバーナ
- 4a 火炎
- 5 出発ロッド
- 6 多孔質光ファイバ母材
- 7 駆動軸
- 8 把持具
- 9 開口部
- 10 上蓋

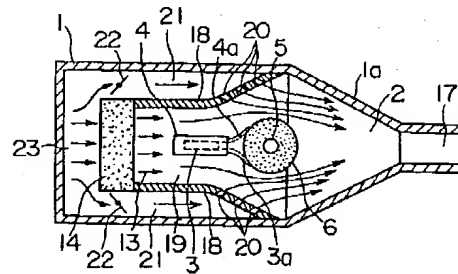
- 11 孔
- 12 シールガス吹出し手段
- 13 整流風
- 14 整流風形成手段
- 14 a 整流板
- 15 フィルタ
- 16 給気ブロア（給気手段）
- 17 排気口

- 18 フローガイド壁
- 19 整流風通路
- 20 ガス吹出し口
- 21 ガラス微粒子付着防止用ガス供給通路
- 22 ダンパ（風量調整手段）
- 23 ガス供給室
- 24 ガラス微粒子付着防止用ガス供給口

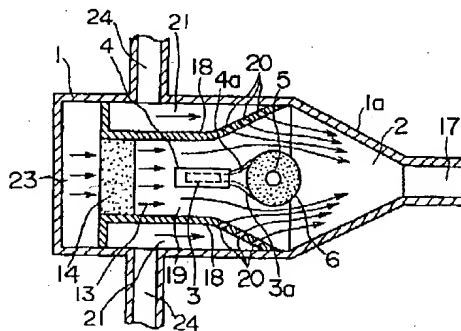
【図1】



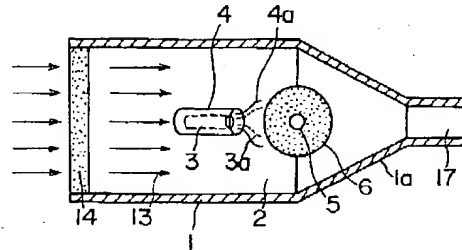
【図2】



【図3】



【図4】



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PUBN-DATE: December 14, 1999

INVENTOR-INFORMATION:

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APPL-NO: JP10149798

APPL-DATE: May 29, 1998

INT-CL (IPC): C03B037/018, G02B006/00

ABSTRACT:

PROBLEM TO BE SOLVED: To provide an apparatus for producing a porous optical fiber preform capable of preventing the adhesion and deposition of glass particulates on the inside wall side of a reaction

vessel even if the volume of this reaction vessel is small.

SOLUTION: The porous optical fiber preform 6 is produced by depositing the glass particulates synthesized in flames 3a, 4a of burners 3, 4 on a starting rod 5 within the reaction chamber 2 of the reaction vessel 1. The reaction vessel 1 is provided with a discharge port 17 on the side opposite to the installation side of the burners 3, 4 across the porous optical fiber preform 6 to discharge the waste gases in the reaction chamber 2. The reaction chamber 2 is internally provided with flow guide walls 18 respectively on both sides across the burners 3, 4. These flow guide walls 18 are provided with many gas blow-off ports 20 for blowing off a gas for preventing glass particulate adhesion into the reaction chamber 2.

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